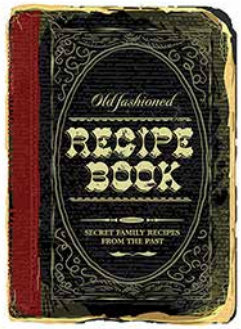
Introduction



Take one child. Place outdoors in nearby green spaces.
Leave for several hours at a time. Repeat daily.
Sprinkle in a dash of adventure.
Fold in a generous portion of exploration and discovery.
Top with wonder and awe. Let rise….

Connecting to Nature

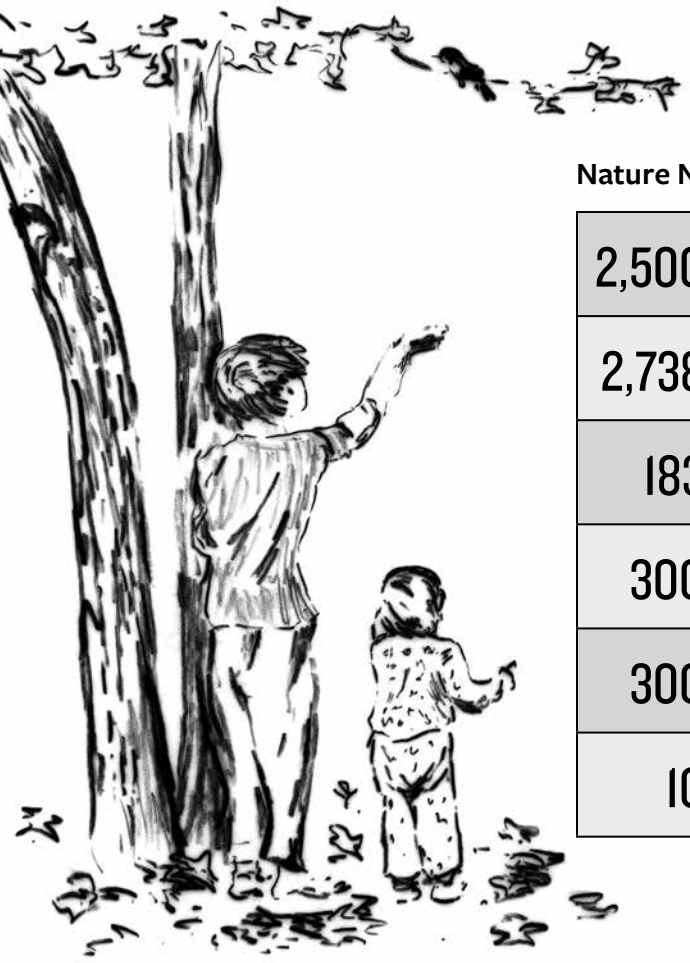
Not long ago, we took a group of children out for a hike to a nearby wetland. Along the way we came across some northern leopard frogs. "Let's catch 'em," some of the boys yelled out, ready to pounce. "Why don't we watch first," we suggested. So we did. We hunkered down and stayed as still as we could. We observed how one frog hopped slowly against a backdrop of sedges and wildflowers, its wet, spotted skin glistening in the sun. We saw how, in less time than it takes for an eye to blink, a pink tongue lashed out and grabbed a grasshopper. "Did you see that?" a number of kids exclaimed with enthusiasm. "That was awesome!" And it most certainly was.

In an increasingly urbanized world, our children are having fewer encounters with the natural world. They are more likely to experience the flickering screen of a computer or the sounds of traffic than the rhythmic chorus of bird or insect song. And sadly, they are more likely to identify corporate logos or cartoon characters than even a few tree or bird species.

Leopard frog

This book calls on all of us to reclaim the natural world as an integral part of our own world. It also asks us to encourage our children to value nature-based experiences. The kinds of experiences in which we hear birds, feel the mud between our toes and stare skyward at northern lights.

In our families and our schools, a sense of belonging comes from laughing, sharing and learning together. Equally important is the sense of belonging that arises from being immersed in the natural world. All children should be given the chance to recognize that they are part of a larger community of other living things. Building community is about creating long-term relationships, not only with each other but with the natural world. And like any relationship this involves commitment, time and effort.



Technology is the Answer, But What Was the Question?

Connected. Plugged in. These are today's new buzz words. And no doubt modern technology has opened up possibilities we could scarcely dream about a century ago. But as the architect Cedric Price once asked, "Technology is the answer, but what was the question?"

Nature Numbers for You to Ponder

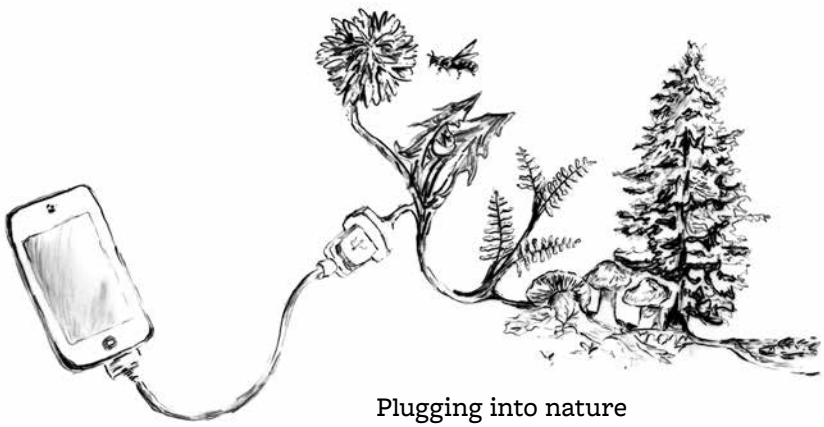
2,500	The number of advertising messages a child encounters in one day
2,738	The number of hours the average North American child sits in front of a glowing screen, per year
183	The number of hours a child spends outdoors in unstructured play, per year
300	The percentage that obesity has increased over the past 20 years for children aged 6 to 11
300	The number of corporate logos the average child can identify
10	The number of native plants and animals the average child can identify

In this book, we'd like you to think about how to raise caring, responsible and engaged citizens—citizens who view their community as more than a collection of buildings, streets and people, but instead recognize that it includes the living systems that support and nurture us all. To re-frame Price's question, "Nature has many answers—how can technology help?" While it is true that there are amazing technological tools—from smartphones to the Internet, from Kindles to iPods—we'd like you to think about selecting technologies that enhance outdoor learning rather than get in its way. As parents, educators, grandparents and community leaders, we all need to help kids—and, increasingly, ourselves—to see the value of connecting to nature, not just to screens.

As a society, we pay a huge price for being disconnected from nature. And nowhere is the price greater than when it comes to climate change. Now, more than ever, we need to pay attention to the many changes in the natural world—some subtle, some dramatic—that are occurring all around us right now. Yes, climate change is partly about disasters, but it's also about numerous "canary in the coal mine" events: early arrival of a migratory bird, early blossoming of a wildflower, late freeze-up of a lake. Noticing these small changes—and understanding that they represent a kind of climate-change early-warning system—requires a critical mass of citizens that know and care deeply for the natural world.

Nature Deficit Disorder

When we grew up (perhaps this sounds familiar to some of you of a certain age) both of us were allowed to play without supervision. Along with a gang of friends we tussled, climbed trees, built forts, rambled. From wading through cattail marshes and playing hide and seek among towering white pines, we came to feel a deep and abiding connection to our environment. We felt as though we belonged to a place, that the green spaces in and around our homes was an integral part of where we lived.



Plugging into nature

A growing body of research in environmental education has emerged called "significant life experiences." Researchers wanted to know what kinds of childhood experiences inspired people involved in conservation to want to protect the environment. Perhaps knowing this would help shape future environmental education curriculum. Not surprisingly, most of the respondents described rich encounters with the natural world while they were growing up. They lived on farms, they tramped through marshes, they visited cottages, they hiked, they canoed, they camped and they discovered. In short, they *engaged* with their natural surroundings. They felt that they were an integral part of their environment. As environmental educator Joy Palmer noted, "Childhood experiences in the outdoors is the single most important factor in developing personal concern for the environment."

In this book, we want to ask, Where will tomorrow's environmentalists come from? Who will advocate for shrinking habitat and the containment of urban sprawl? Who will speak for threatened and endangered species and for our own green spaces, when the formative experiences that make for caring stewards of our environment are removed from childhood?

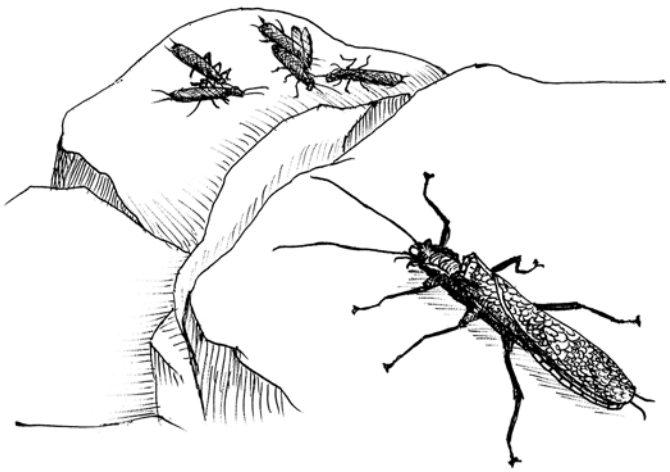
In his popular book *Last Child in the Woods*, Richard Louv has a chilling term for those children who grow up in a world without nature. He coined the phrase "Nature Deficit Disorder" to describe some of the characteristics associated with a childhood spent indoors. He does not use the term in a medical sense. Rather, he wants us to consider what the long-term impacts might be for a child who grows up having little or no contact with the natural world. Here are some unexpected consequences of a childhood spent indoors:

- Because children are spending less time outside (and therefore are not getting regular exercise), rates of childhood obesity in North America have almost tripled over the past 20 years.
- Playing in nature promotes healthy development. Swedish scientists have found that children who explore and play in natural environments tend to be less competitive and more cooperative, and demonstrate fewer incidents of "interrupted play" (when adults have to intervene to prevent fights) than those who play in areas dominated by asphalt and play structures. Researchers

have discovered that playing in nature enhances creative thought, stimulates imaginative play and improves a child's ability to concentrate during school.

So, just what is stopping children from going outside? Here are a few factors:

- The natural world is perceived as dangerous. Louv calls this the "Bogeyman Syndrome." Studies have shown that the incidence of stranger abduction (stranger danger) is no more acute than it was 30 years ago, but he believes that the sheer amount of violence dramatized on the news and in TV shows and movies amplifies parents' fears.
- Liability concerns have put real pressure on school boards, city parks, daycares and other institutions to make sure children in their care stay "safe." Ironically, keeping children inside when the weather becomes cold, cutting down bushes near a school or getting rid of an untidy section of park land may just do the opposite. They prevent real opportunities for children to participate in natural play. Louv wants us to consider the opposite point of view; he believes it is unsafe *not* to take children outside.
- Nature has become the unknown. Not only do fewer and fewer children know the names of common plants and animals, but many people are honestly afraid that nature is out to get them. One common example is a generalized fear of spiders and insects. In reality there are just a few hazards, among them ticks, a few stinging insects, a handful of poisonous plants and snakes and the remote chance of getting lost. Serious dangers, such as an attack from a wild animal, are so rare as to be negligible. For example, there are about three bear-related fatalities per year in North America. Compare this with 115 deaths every single day from vehicle crashes in the United States—one every 13 minutes. Every ten minutes someone gets injured falling down stairs in North America. And yet none of us thinks twice about getting into an automobile or climbing stairs. But we're scared of camping in the wilderness!



Winter stoneflies

- Unsupervised play is no longer socially acceptable. There is real social pressure to know where your children are for every moment of the day. Kids are "super" supervised. Yet Louv tells us that children learn important life skills by negotiating, problem solving and sharing during periods of unstructured play.

About *The Big Book of Nature Activities*

We hope that this book will inspire you with ideas, activities and information that will help foster a sense of place and, as importantly, a sense of belonging to your local environment. "Seeing" in nature means knowing what to look for and what to expect.

Nature is filled with rhythms, with cyclical change. This means being aware each and every day of signs that the seasons are changing; tuning in to the presence or absence of bird, frog and insect song; noticing the mix of tree species around us; appreciating how the smell of the air changes with each passing month; and being able to identify and describe the typical flora, fauna, landforms and climate of your region. Nature awareness is a feeling of comfort, integration and familiarity, a sense of being among friends, when you are out in the natural world. The upside for society is that by feeling this emotional connectedness, you automatically want to do your part to protect the natural environment.

We also want to make people more aware of evolution and how it is manifested in even the most common, backyard species. Armed with a little knowledge, we can learn to appreciate the wonder that resides in all species, not just the charismatic ones. The evolutionary story of the dandelion is every bit as compelling as that of the blue whale. Knowing a little bit about how evolution has shaped the behavior and appearance of a species enhances our appreciation of nature.

Who The Big Book of Nature Activities *is for*

This book is a resource guide for parents, grandparents, teachers, environmental educators, daycare providers, youth groups, camp leaders, park naturalists—anyone who wants to take children and

adolescents outside. Many kids become interested in nature if they witness adults showing a keen interest as well. In fact, though many of the activities are aimed at children, they often apply equally to adults.

What is inside The Big Book of Nature Activities*?*

We created this book to be a compendium of nature-based activities organized around seasonal change. Inside you'll find activity suggestions based on what is happening in nature during each season of the year.

Structure of season chapters

Introduction to season: An evocative description of the "mood" of the season and an overview of what is going on at that time of year.

Key Natural Events and Regional Highlights: A summary of some key events in fauna, flora, weather and the sky across North America but specific to each region. Keep a record: we suggest you check off and date each of these events as you observe them. We'll also suggest activities in the seasonal chapters that relate to the events.

Poems: Seasonal poems lending themselves well to memorization. Memorizing the poems also adds greatly to one's "sense of season," since the writing often captures the unique feeling of the time of year.

Collection Challenge: Suggestions for what to display or collect over the season for your nature table and collection box.

Art in the Park: Ideas for what to sketch and photograph—suggestions on interesting phenomena to draw or snap pictures of. The photographs can be used to make a nature journal, indicating where and when each picture was taken.

What is Wrong with the Scenario?: Nature Aware? Can you spot the mistakes made in a seasonal description?

Story of Black Cap, the Chickadee: A story that follows a black-capped chickadee and its interesting behaviors over the course of the year; includes suggested activities.

At Your Magic Spot: A suggested activity that children—or adults—can do at their "Magic Spot." This is a special, nature-rich area close to home that the child has chosen and visits regularly. It is a place to write and draw about sightings, feelings, questions, etc.

Exploring the season: Things to do. A selection of fun activities like games, exploration ideas, crafts and scavenger hunts is based on what is happening in nature during this season. We'll activate your senses, keep track of phenological events, and explore evolution and fascinating aspects of birds, mammals, reptiles and amphibians, fish, invertebrates, plants, fungi, weather and the sky. We also offer up suggestions on how to make nature part of seasonal celebrations.

Darwin: The father of modern biology will share facts, ideas and inspiration about evolution during each season. He'll even tell budding young scientists what still needs to be discovered!

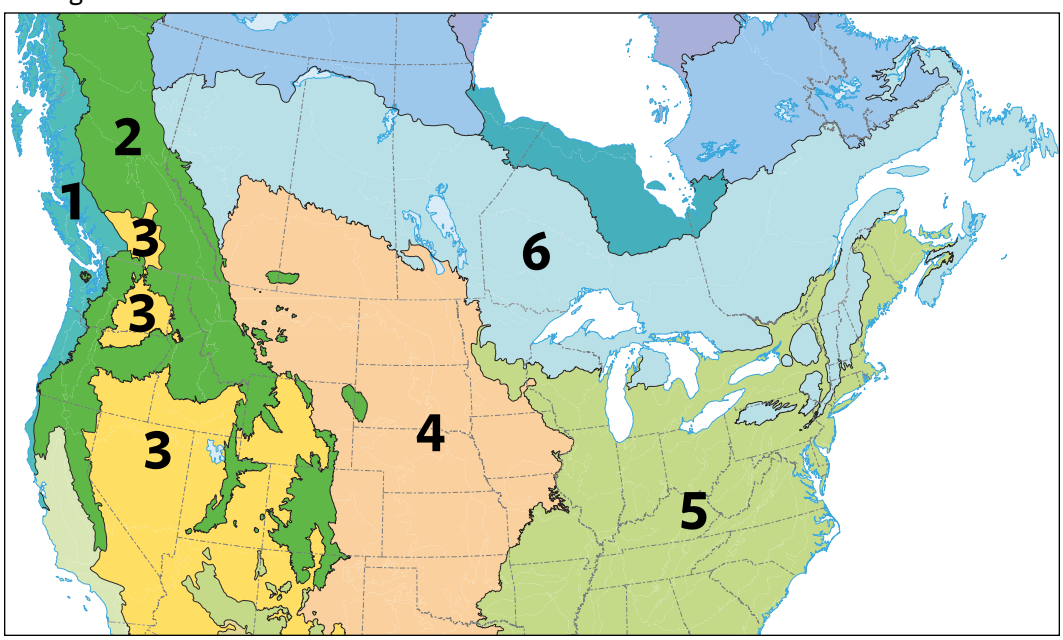
Carl Sagan: Sagan was a famous American astronomer and science communicator. He will tell you about the wonder of the universe.

Neil deGrasse Tyson: Tyson is an America astrophysicist and director of the Hayden Planetarium in New York City. In 2014, he hosted the television series "Cosmos: A Spacetime Odyssey." Tyson and Sagan together will help to explain some of our current thinking about the universe"

Geographical Area Covered

The natural events described in the book cover an area extending from British Columbia in the northwest down to northern California in the southwest, and from Newfoundland in the northeast down to North Carolina in the southeast. This area includes six ecological regions, as identified by the U.S. Environmental Protection Agency (Western Ecology Division).

Ecological Zones of North America



North American Ecological Zones

Region	Boundaries	Description
1. Marine West Coast	The Pacific Coast from Alaska south through northern California.	Characterized by mountains bordered by a coastal plain. Has the wettest climate of North America and contains large areas of temperate rain forest.
2. Northwestern Forested Mountains	The mountainous regions of the interior of British Columbia, Washington, Oregon, northern California, Idaho, Montana, Wyoming, Nevada, Utah and Colorado.	Contains four biological (life) zones: the Foothills Zone (transition from plains to mountains); the Montane Zone (lower slopes and valleys above the foothills, with the greatest variety of wildflowers, trees and shrubs); the Subalpine Zone (from the upper edge of the Montane to the treeline, with dense clumps of evergreens and wildflower meadows—most people's image of the western mountains); and the Alpine (Tundra) Zone (the area above the treeline, with bare rocks, glaciers and alpine meadows).
3. North American Deserts	Covers parts of south-central British Columbia, Washington, Idaho, Oregon, Nevada and northern California. Much of this area is also known as the Great Basin.	Distinguished from the adjacent forested mountain ecological region by its dryness, its unique shrubs and cacti (with a lack of trees) and generally lower relief. It has a desert and steppe climate, arid to semi-arid with marked seasonal temperature extremes.
4. Great Plains	From the prairies of southern Alberta, Saskatchewan and Manitoba, south through the Great Plains of the United States to Kansas, to western Indiana in the east and the foothills of the Rocky Mountains in the west.	The Great Plains is distinguished by mostly flat grassland with very few forests. The climate is semi-arid. Almost 95 percent of the prairies have been converted into farmland, with predictable effects on the original plant populations. Many native prairie vegetation types have been radically transformed.
5. Eastern Temperate Forests	Covers southern Minnesota in the northwest, New Brunswick in the northeast, Missouri in the southwest and North Carolina in the southeast.	This ecological region has a moderate to mildly humid climate with a relatively dense and diverse forest cover. There is a great diversity of species.
6. Northern Forests	From northern Alberta east to Newfoundland and Nova Scotia, and south through parts of New Hampshire, Vermont, Pennsylvania, Michigan, Wisconsin and Minnesota.	Distinguished by extensive boreal forests and a high density of lakes situated on the Canadian Shield. The climate is characterized by long, cold winters and short, warm summers.

100 Continent-wide Species to Learn

40 Birds: Canada goose, snow goose, mallard, bufflehead, common merganser, common loon, double-crested cormorant, great blue heron, turkey vulture, osprey, red-tailed hawk, bald eagle, sandhill crane, killdeer, herring gull, mourning dove, snowy owl, downy woodpecker, northern flicker, peregrine falcon, merlin, common raven, American crow, tree swallow, barn swallow, black-capped chickadee, white-breasted nuthatch, house wren, American robin, European starling, cedar waxwing, common yellowthroat, yellow-rumped warbler, chipping sparrow, song sparrow, dark-eyed junco, red-winged blackbird, brown-headed cowbird, house finch, American goldfinch

15 Mammals: Big brown bat, black bear, raccoon, mink, river otter, striped skunk, coyote, red fox, bobcat, beaver, muskrat, deer mouse, porcupine, snowshoe hare, white-tailed deer

21 Invertebrates: Canada tiger swallowtail, clouded sulphur, monarch, woolly bear (Isabella moth), tent caterpillar, common green darner, autumn meadowhawk, bluet damselfly, fall field cricket, snowy tree cricket, Carolina grasshopper (locust), dog-day cicada, honeybee, bumblebee, yellow jacket, firefly, whirligig beetles, crab spider, harvestman (daddy longlegs), wood tick, water strider

4 Amphibians and Reptiles: Bullfrog, painted turtle, leopard frog, garter snake

7 Trees and Shrubs: Tamarack, white spruce, quaking (trembling) aspen, white birch, weeping willow, chokecherry, poison ivy

13 Wildflowers, Ferns and Fungi: New England aster, black-eyed susan, Canada goldenrod, marsh marigold, oxeye daisy, Queen Anne's lace, jewelweed, wood fern, shaggy mane mushroom, morel, fly amanita, giant puffball, artist's conk

Some Key Regional Species to Learn

1. Marine West Coast

25 Birds: Tundra swan, harlequin duck, surf scoter, red-throated loon, western grebe, black oystercatcher, western sandpiper, dunlin, glaucous-winged gull, barn owl, Anna's hummingbird, red-breasted sapsucker, Steller's jay, western scrub jay, violet-green swallow, chestnut-backed chickadee, bushtit, Pacific wren, varied thrush, spotted towhee, fox (sooty)

sparrow, white-crowned sparrow, western meadowlark, Brewer's blackbird, Bullock's oriole

10 Mammals: Columbian black-tailed deer, elk, Townsend's chipmunk, western gray squirrel, Douglas' squirrel, California sea lion, harbor seal, orca, gray whale, sea otter

4 Amphibians: Western toad, Pacific tree-frog, rough-skinned newt, western redback salamander

5 Fish: Chinook salmon, pink salmon, chum salmon, coho salmon, sockeye salmon

5 Invertebrates: Painted lady, sea stars, anemones, banana slug, almond-scented millipede

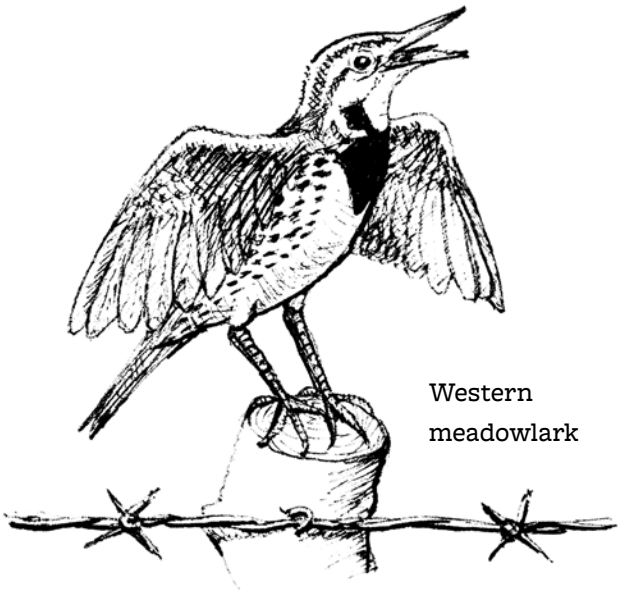
6 Trees and shrubs: Western red cedar, coastal Douglas fir, coast redwood, bigleaf maple, Pacific madrone (arbutus), salal

5 Wildflowers: Douglas aster, California goldfields, California buttercup, California poppy, western skunk cabbage

2. Northwestern Forested Mountains

15 Birds: Western grebe, golden eagle, rufous hummingbird, violet-green swallow, Steller's jay, Clark's nutcracker, black-billed magpie, mountain chickadee, American dipper, mountain bluebird, spotted towhee, western tanager, yellow-headed blackbird, Bullock's oriole, western meadowlark

10 Mammals: Mule deer, bighorn sheep, elk, cougar, American badger, American pika, yellow-bellied marmot, red squirrel, golden-mantled ground squirrel, least chipmunk



Western meadowlark

5 Amphibians and Reptiles: Western tiger salamander, western toad, Sierran treefrog, western skink, rubber boa

2 Fish: Cutthroat trout, rainbow trout

3 Invertebrates: Weidemeyer's admiral, anise swallowtail, eight-spotted skimmer dragonfly

10 Trees and Shrubs: Engelmann spruce, lodgepole pine, Douglas fir, ponderosa pine, Rocky Mountain juniper, Rocky Mountain maple, Saskatoon berry, rabbitbrush, thimbleberry, sagebrush

5 Wildflowers: Old man's whiskers, mariposa lily, yellow avalanche lily, alpine bistort, western showy aster

3. North American Desert

22 Birds: Cinnamon teal, California quail, greater sage-grouse, western grebe, Swainson's hawk, golden eagle, black-necked stilt, American avocet, barn owl, black-chinned hummingbird, red-naped sapsucker, prairie falcon, Bewick's wren,

violet-green swallow, mountain chickadee, black-billed magpie, western bluebird, lark sparrow, black-throated sparrow, yellow-headed blackbird, western meadowlark, Bullock's oriole

6 Mammals: Golden-mantled ground squirrel, black-tailed jackrabbit, American badger, bighorn sheep, pronghorn, mule deer

5 Amphibians and Reptiles: Great Basin spadefoot toad, tiger salamander, short-horned lizard, sagebrush lizard, Great Basin gopher snake

7 Invertebrates: Western tiger swallowtail, Becker's white, eight-spotted skimmer, black meadowhawk, pallid-winged grasshopper, Jerusalem cricket, pale wind-scorpion

10 Shrubs, Grasses, Wildflowers and Fungi: sagebrushes (e.g., big sagebrush), rabbitbrush, fourwing saltbush, greasewood, bluebunch wheatgrass, cheatgrass, sulphur-flower buckwheat, plains prickly-pear cactus, arrowleaf balsamroot, desert stalked puffball

4. Great Plains

17 Birds: Cinnamon teal, sharp-tailed grouse, western grebe, American white pelican, Swainson's hawk, black-necked stilt, American avocet, American woodcock, ruby-throated hummingbird, blue jay, black-billed magpie, dickcissel, vesper sparrow, northern cardinal, yellow-headed blackbird, western meadowlark, bobolink

10 Mammals: American bison, mule deer, pronghorn antelope, eastern gray squirrel, black-tailed prairie dog, white-tailed jackrabbit, Richardson's ground squirrel, Franklin's ground squirrel, American badger, black-footed ferret

6 Amphibians and Reptiles: Tiger salamanders, striped chorus frog, Great Plains toad, spiny softshell turtle, prairie rattlesnake, short-horned lizard

4 Fish: Walleye, largemouth bass, lake whitefish, orange-spotted sunfish

3 Invertebrates: Spring azure, eight-spotted skimmer, black meadowhawk

14 Trees, Shrubs, Grasses and Wildflowers: Eastern red cedar, eastern cottonwood, greasewood, sagebrush, blue grama grass, big bluestem, cheatgrass (invasive), white prairie aster, red swampfire, eastern pasqueflower, bitter root, Indian blanket, Wyoming Indian paintbrush, wood lily

5. Eastern Temperate Forest

19 Birds: Great egret, American woodcock, laughing gull, barred owl, chimney swift, ruby-throated hummingbird, red-bellied woodpecker, blue jay, purple martin, tufted titmouse, Carolina wren, eastern bluebird, northern mockingbird, white-throated sparrow, northern cardinal, rose-breasted grosbeak, common grackle, eastern meadowlark, Baltimore oriole

8 Mammals: Fox squirrel, eastern gray squirrel, red squirrel, southern flying squirrel, eastern cottontail, groundhog, Virginia opossum, humpback whale

17 Amphibians amd Reptiles: Spring peeper, chorus frog, gray treefrog, eastern cricket frog, green frog, American toad, eastern newt, eastern red-backed salamander, northern dusky salamander, spotted

salamander, marbled salamander, common snapping turtle, box turtle, wood turtle, northern water snake, redbelly snake, eastern milksnake

7 Fish: American shad, channel catfish, pumpkinseed, bluegill, largemouth bass, smallmouth bass, yellow perch

10 Invertebrates: Butterflies: white admiral, viceroy; moths: Cecropia, luna, hummingbird clearwing moth; dragonflies: beaverpond baskettail; damselflies: river jewelwing, bluets; cicadas: Linnaeus's 17-year cicada; true katydids: common true katydid

18 Trees and Shrubs: Eastern white cedar, white pine, bald cypress, sugar maple, red maple, white oak, shagbark hickory, black cherry, tulip tree, white ash, black walnut, sassafras, sweetgum, American sycamore, flowering dogwood, staghorn sumac, Virginia creeper, pussy willow

12 Wildflowers and Ferns: Eastern skunk cabbage, Hepatica, white trillium, azure bluet, wild geranium, yellow lady's slipper, wild columbine, trailing arbutus, great laurel, common blue violet, ostrich fern, sensitive fern

6. Northern Forest

20 Birds: Ruffed grouse, American woodcock, barred owl, chimney swift, ruby-throated hummingbird, yellow-bellied sapsucker, pileated woodpecker, eastern phoebe, red-eyed vireo, blue jay, gray jay, gray catbird, ovenbird, white-throated sparrow, white-crowned sparrow, northern cardinal, common grackle, eastern meadowlark, bobolink, Baltimore oriole

8 Mammals: Moose, gray wolf, eastern chipmunk, eastern gray squirrel, red squirrel, woodchuck, harp seal, humpback whale

12 Amphibians and Reptiles: Spring peeper, gray treefrog, green frog, bullfrog, wood frog, American toad, blue-spotted salamander, spotted salamander, eastern

Ovenbird and young

newt, eastern red-backed salamander, common snapping turtle, northern water snake

10 Fish: Brook trout, lake trout, white sucker, northern pike, muskellunge, walleye, yellow perch, pumpkinseed, smallmouth bass, rock bass

10 Invertebrates: Butterflies: European skipper, white admiral, viceroy; moths: Cecropia, luna, hummingbird clearwing; dragonflies: beaverpond baskettail, Canada darner, familiar bluet; damselflies: river jewelwing

20 Plants: Balsam fir, white pine, jack pine, red maple, red oak, white ash, staghorn sumac, lilac, red-osier dogwood, Labrador tea, bunchberry, trailing arbutus, pink lady's slipper, blue flag lily, pitcher plant, yellow trout lily, white trillium, Hepatica, tall flat-topped aster, common milkweed

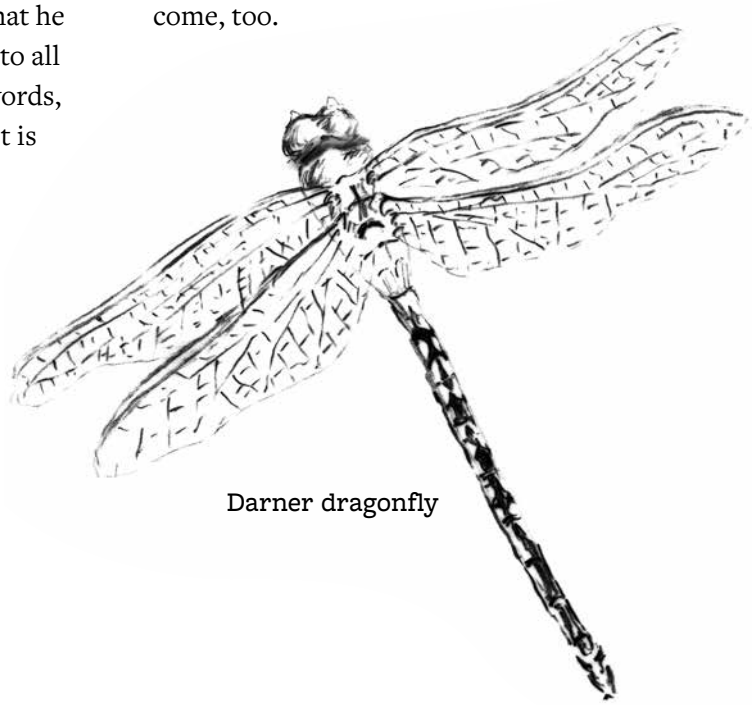
How to Raise a Naturalist

Eric Fromm coined the term *biophilic*, to describe the innate need all children have to connect with other species, what he called the desire to be "attracted to all that is alive and vital." In other words, children are born loving nature. It is a need that is deeply rooted in all our genes. Edith Cobb argues that there is a window of time lasting from early childhood until about 14 years of age when, if children are provided with rich and repeated experiences in nature, they are more likely to develop a life long love for the natural world. If we keep our children indoors, however, we run the risk that nature may simply become the backdrop for their daily lives, as inconsequential as the billboards, neon lights and telephone poles that decorate our cityscapes.

Children are active, curious, energetic and enthusiastic. They love to play, imagine, discover and explore. No wonder that a conventional hike through a park or the woods can be boring for a child. Take a few steps off the trail, however, and roll over a log, dip a butterfly net in a pond or romp along the edges of a rushing stream, and the experience suddenly becomes an adventure.

So, how can adults be effective mentors?

- Open doors but don't "push them through." Ultimately, loving nature should never be forced. Children will pick up and emulate your enthusiasm. Take time out of your personal life to get outdoors. If children see you making an effort to be out in nature, they'll want to come, too.

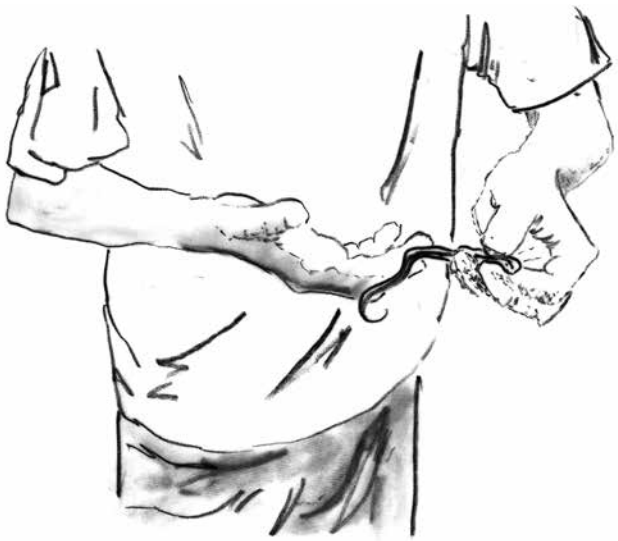


Darner dragonfly

- Go forth with explorer's eyes. Be amazed at what you see, but also allow your children the gift of discovery. For example, you might know where to find salamanders along a certain trail. You could simply say to your children, "Hey… do you want to find a salamander?" Or you might say, "I wonder what we'll find under these logs?" In the first instance, you have owned the discovery; in the second, the excitement and joy belongs to the child. There is nothing quite so thrilling as a child bellowing out in a lusty voice, "Look what I found!" Remember to give children the time and space for discovery. Revealing a small hint of that which is normally hidden from our sight is empowering, inspiring and, at times, simply unforgettable.
- Remember that play can be a powerful teacher. The natural landscape lends itself to creative play. A stick can become a magic wand, a sword or a tent pole; a copse of trees, a castle. It is through unstructured play that children cultivate and enhance their imaginations. Being creative means creating—letting your children make forts, mud pies and flower crowns. Never doubt the value of exploring and playing in the natural environment—these experiences are at the very heart of developing young naturalists.
- Buy your child a good hand lens (10×), a small compound microscope and, when they are ten or so, a good pair of binoculars. Teach them to delight in the very small, from the cells of leaves enlarged by a microscope to the feathery antennae of a moth revealed by a hand lens. A close-up view gives you an entirely different perspective on the natural world. Learn to use binoculars to view birds, the Moon or even a distant galaxy (see page 27).
- Encourage building in nature. One of our most memorable childhood experiences was building a fort or tree house. Children have a yearning to create dens, nests and hiding places. The process of building involves problem solving, understanding the properties of natural materials and lots of exercise! Together, build a survival debris hut (see page 134).
- Set up a terrarium in your house. A terrarium is basically an aquarium that is filled with plants, soil and rocks suitable for terrestrial or land-based creatures. Allow your children to bring home "pets" for a few days: caterpillars, frogs, insects. Don't forget to release each critter in the same place you found it! (see page 132).

Ash seeds make a nice addition to the collection table

- Create a collection table and let your children display their discoveries—perhaps a collection of shells, feathers, plant material, living invertebrates. When they find something new, put something else back from where it came—in this way the table changes over time.
- Encourage your child to join up with a local group of birders on outings. This can be a particularly powerful experience when some of the birders are teenagers—they make excellent role models. See if there are any Junior Field Naturalist Clubs in your area.
- Take your child to the zoo, the aquarium and the botanical garden. Pick a particular animal or plant (orchids for example) for close-up study and focused observation instead of just wandering passively through the exhibits.
- Take your child camping. Being outside for 24 hours a day allows you to see and hear things you might otherwise miss. Positive camping memories will make it much more likely that your child will want to camp as an adult.
- Speak positively about nature. We forget as adults how powerful language can be. Be careful how you speak about nature—we communicate values through our words and expressions. Seeing a bug may elicit the response "Yuck—is that ever creepy!" or "It's dirty—you don't know where it's been." To cultivate a sense of wonder, you need to use the language of wonder: "Wow—is that ever cool"—"Did you see that?" Show surprise, curiosity and joy in everyday observations of the natural world: the movements of an ant, the wagging of a dog's tail, the stealth of a cat, the smell of a flower, the myriad shapes of leaves. In other words, take notice, show respect and, more than anything, display *enthusiasm*, because kids will see that you truly value and love the natural world.
- Huh? Consider the art of questioning. A question can either inspire curiosity or shut it down completely. The engine of learning is curiosity. A name or a label is merely a beginning point, the start of a story—it is up to you to keep the story going! A good question should invite other questions. Think about your questions as ways to encourage kids to ask why, to wonder, to marvel at the natural world and to want to explore further. Let's think about the bird called a white-breasted nuthatch. A good beginning question



Child holding a garter snake

might be, "Why is she upside down on the tree?" (Scientists think she can spot insects that right-side birds miss). How does she fly? (Like a rollercoaster, with an up-and-down pattern). Why is she called a nuthatch? (From her ability to jam large nuts into tree bark, then whack them with her sharp bill to "hatch" out the seed from the inside.) Don't be afraid to say "I don't know!" when a child asks you a question. Think of this as an opportunity to find out together. Look it up. And if you still don't know, isn't it wonderful that there are still so many things that science does not yet understand? You might suggest that this is a question that they, as curious young people, may be able to find the answer to when they grow up.

White-breasted nuthatch

How Do We Get Kids Outside?

(*and more or less on their own*)

Despite a decrease in violence against children in recent years, parental *fear* is still real. This should be respected and not dismissed. Not many parents feel comfortable letting their kids roam free, so we need ways to reduce perceived risk, manage fear and still get our kids outside.

1. Take your kids outdoors yourself but be a "hummingbird parent": If we want our children or grandchildren to experience nature, we'll need to be more proactive than parents of past generations. Just try to stay out of your kids' way much of the time, so they can explore and play in nature on their own. You can always "zoom in" like a hummingbird, when safety may be an issue (which thankfully, isn't very often). Slowly increase this distance and their autonomy as time goes by. Kids crave and thrive on autonomy, so don't be afraid to "let them loose" sometimes—with a minimum of rules!

2. Organize family nature clubs: An increasingly popular way to get kids engaged with nature is for families to get together and create their own informal nature clubs. The benefits are many: family ties are strengthened, a sense of community is enhanced and kids often become passionate about nature by experiencing it with their peers. To get started, all you need is

a group of people with an interest in connecting children with the natural world. Start by inviting your friends and their families to gather once or twice a month in a nearby park, preferably with trails. You will be surprised how interesting your local parks can be. Later, you may wish to advertise at your school or community organization, should you want to expand the group. And don't worry if you lack nature skills. All that really matters is being enthusiastic about getting your family outdoors. Consider asking a local naturalist to come along on some of your hikes to help with species identification. Groups usually gather before or after the hike for a potluck meal, after which the kids play on their own in a nearby woods or field, while the adults relax and socialize.

Characteristics of Kids and Nature: Ages and Stages

We've found that children of different ages respond to nature in different ways. Use the hints below to help you approach nature with preschoolers, teens and in-betweens.

Younger children

1. Nature playscapes: Kids aged three to eight love to pretend, imagine and, especially, play. Never underestimate the power of creative play in natural landscapes. The space under the fragrant branches of a spruce can magically transform into a castle or a spaceship. A fallen log might morph into a canoe or pirate ship.

2. Micro-environments: I remember taking my two young children to a wonderful overlook. We hiked the better part of two hours to get there. The view was breathtaking, with lakes and hills glistening in the afternoon sun. And there were my children hunched at their feet—staring at a caterpillar crawling along the ground. Young children have a contracted view of the environment; they respond to what is immediately in front of them. Spend time with your younger children soaking in the details of your surroundings.

3. Tending: Young children yearn to belong and crave connections to other living things. They want to nurture and care. Provide your children with the chance to tend a garden, raise monarchs, look after a lizard. Even growing herbs in planter boxes and harvesting the fragrant leaves connect children to the natural world and to local food. Don't forget that children learn by imitating. When I was shoveling in the garden, so was my three-year-old daughter, right alongside me—with her own tiny shovel. After we went for a nature walk, she would set up her own nature walk, right there in the backyard. Children are more likely to love nature when they see you making a genuine effort to love it yourself.

Middle childhood (In betweens)

Eight to 12 is an evocative age—an age ripe for discovery and immersion in natural landscapes. Flipping over logs, climbing trees, wading in wetlands, jumping in puddles, catching bugs in ponds and

staring upward into the deep beyond of the night sky are all activities that children of this age love to engage in.

1. Exploration and discovery: Our children are born explorers, full of unbridled enthusiasm and energy for the world around them. Sadly, this is also the time that many children are holed up inside, trapped behind a glowing screen. If we don't connect them to the wonder and mystery that resides in nearby green spaces now, they may grow into teens that experience the outdoors as a place that is uncomfortable, foreign and, at worst, irrelevant to their daily lives.

2. Action projects: Kids need to feel a sense of agency, need to believe that they can and will make a difference. Encourage kids to participate in activities that enhance nature in their own neighborhood, perhaps by naturalizing a backyard or a school ground—building nesting boxes, planting trees, creating pollinator gardens—or by helping to protect local green spaces.

Older children

As kids get older (ages 12 to 17), they crave adventure! They want to prove that they are tough, strong and resilient (which of course, they are!). They often yearn for activities with an element of competition such as birding.

1. Recreational exploration: Ah, the pendulum teenager: one moment sitting sullen, arms folded on the couch, angry at the world; the next moment, jumping around the living room, coursing with energy—enough to power a small town. One way to deal with these mood swings is to introduce your teenagers to the outdoor skills that help them connect to nature. Take them on an overnight camping trip. Make sure that your itinerary is robust enough to be challenging but that they have the food, clothing and equipment to be comfortable, even in inclement weather. Competitive activities such as geo-caching are also popular with teenagers and still have a modicum of nature appreciation.

2. Traditional skills: Have your children experiment with bow-drill fire-making, shelter-building, basic tool-making or cordage. There is something immensely satisfying about creating your own fire—by rubbing wood against wood. Some of

Child rolling over a log

our most popular children's programming has involved teaching traditional skills. We've included traditional games and activities in this book.

Build Nature Skills: For teenagers who really show an interest in nature, encourage them to:

3. Contact a local naturalist club: They may know of teenagers in your community who are active birders. Your son or daughter may be able to join them in their outings.

4. High schools often have environmental or outdoor clubs: Many schools also take part in "envirothons," environmentally themed academic competitions. Contact the science department at your high school.

5. Find a local cause and encourage your kids to get involved: There is always a wetland to save, a park to protect or habitats to enhance. Kids need to feel like they can make a difference. Participating in local action empowers children and helps them recognize what it means to be part of a larger community.

Making a fire with a bow drill

Adults and Nature: How Knowledge and Appreciation Enhance Our Lives

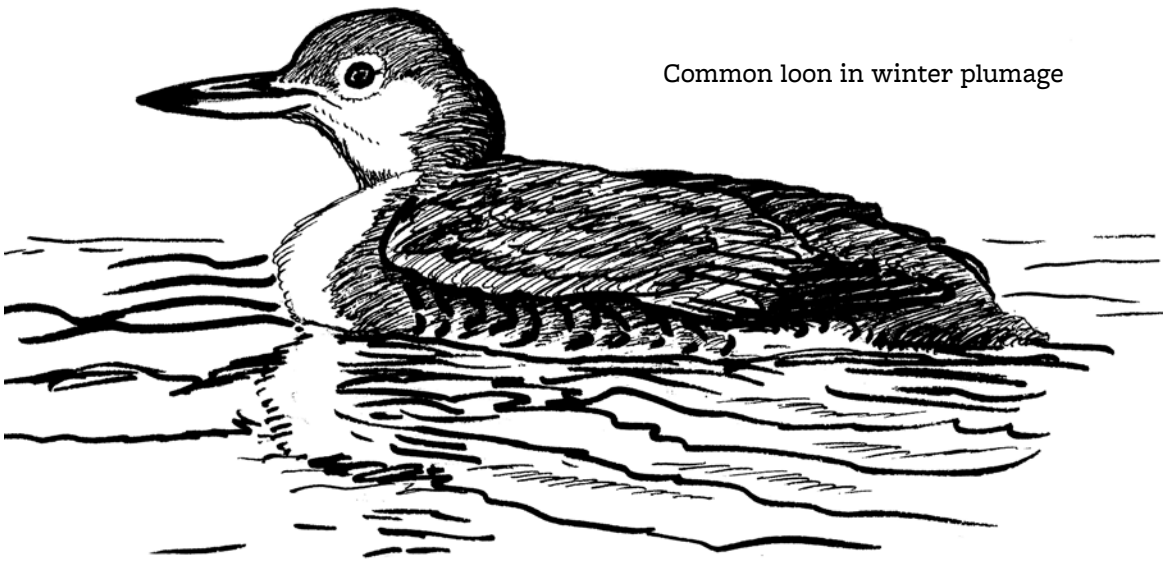
From the joy of encountering a brand new season to the sense of wonder as a loon's call echoes across a starlit lake, adults find pleasure from nature in so many ways. Spending time in nature makes us not only physically fitter but also psychologically healthier. We also gain a more balanced perspective on the world's problems, and this in turn makes us less inclined to believe in the myth of human dominance of—and separateness from—nature. Many of us who develop a deep relationship with the natural world come to understand that we are as much a part of the biosphere as any other species. Our physical, mental and spiritual well-being depend not only on clean air, clean water, healthy soil and a stable climate but also on the company of other species.

Almost everyone has an intuitive sense of the restorative power of natural environments. As Trent University psychologist Dr. Lisa Nisbet writes: "We may not think of nature contact as

a health practice, but in other parts of the world scientists have been studying nature's benefits for several decades. Forest medicine researchers in Japan, Korea, and Finland are untangling the nature-specific mechanisms responsible for stress reduction. Our built environments are often full of traffic, technology, and noise. This detracts from the limited attentional resources we have, making us tired and unable to concentrate. Natural environments seem to replenish these resources as well as improve our mood. Medical researchers and environmental psychologists have been testing how nature contact can improve human physical and mental health, to buffer the stress of modern living" (*Peterborough Examiner*, March 5, 2015).

Having some basic knowledge of the natural world in our own bioregion connects us intimately to the particularities of place and serves as an antidote to the many forces of homogenization at work in the world today. Knowing the plants and animals of where you live, be it a cottage community, a local park or a suburban backyard, makes any outing—or simply just going outside—infinitely more interesting. There is also a strong emotional dimension in knowing and identifying with a specific location, landscape and mix of species. This "sense of place" roots us and helps us to know who and where we are. It also helps to promote an ethic of stewardship and conservation. This is why so many cottagers, for example, are

> Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul.
>
> — JOHN MUIR



Common loon in winter plumage

also engaged environmentalists and care deeply about the health of their lakes and surrounding areas.

Paying attention to the night sky, too, eventually leads to curiosity about the origin and history of the universe. We soon learn that nearly all of the elements that make up the atoms in our bodies were created in exploding stars billions of years ago. So, yes, we are literally made of stardust. Humans are, therefore, "of the universe" much more than "in the universe." From the flowers and insects in the garden to the stars and galaxies looming above us in the night sky, knowing and appreciating the natural world helps to cultivate a deeply satisfying sense that human beings are part of something much bigger. We are intimately related not only to all other species but also to the universe as a whole. There is both awe and comfort in this knowledge.

Species Identification and Naming

The importance of being able to identify and name species has always been a subject of much debate in environmental education. Granted, too great a focus on naming can become boring and frustrating. However, that's not because people somehow lack the ability or the force of memory to learn the names. People may need a naturalist to help them put names to species in a forest, but these same people would never need such assistance when wandering through stores in a mall. They would instantly recognize and be able to name hundreds of products, based mostly on the company logos. Even crows can recognize the McDonald's logo and go to a McDonald's bag first when scavenging in a parking lot.

We feel that it is important to be able to identify and name at least the common species. The process of identification involved in naming forces the observer to look for specific field marks and to notice important differences between species. This, in turn, makes us more aware of the natural order of living things and the incredible diversity of the natural world—and appreciating biodiversity is hugely satisfying. To walk in the woods and not recognize the common trees, wildflowers and birds is not to see them.

> A rose by any other name may smell as sweet, but without a name it is simply a flower.
>
> — **JIM WRIGHT and JERRY BARRACK,** ***In the Presence of Nature***

Plants, for example, become nothing less than a green blur. When we can put names to the plant and animals that we see during a walk, we are suddenly among friends—friends whose names we know. Remember, though, that a name is simply the beginning. The real magic comes from finding out more about each and every living thing—from how it is adapted to its environment to the part it plays in its vibrant living system.

For each region, we have prepared a list of common plants and animals to try to see, identify and name (see pages 10–14). Along with an understanding of basic concepts such as evolution, pollination and photosynthesis, being able to put a name to these common species and phenomena is part and parcel of "nature literacy."

One more thing…

We hope that you will find small and simple ways to enrich yourself, your children, your grandchildren or your students through a closer relationship to the natural world. And to help us recognize that whatever actions we undertake should be not just for our own benefit but also for those millions and millions of living creatures yet to be born. By bestowing on our children—and ourselves as adults—the gift of nature, we are fostering both conservation and conservationists. In the end, we will only be inspired to protect what we know and love.

Smelling a sunflower